

GUIDE OF GOOD HYGIENE PRACTICE FOR THE JAMS, JELLIES AND MARMALADES INDUSTRY

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INTRODUCTION

The Council of the European Communities adopted a horizontal directive (93/43/EEC of June 14th, 1993) on THE HYGIENE OF FOODSTUFFS (O.J. no L 175 of 19.07.1993). This directive lays down the general rules of hygiene and the procedures for the verification of compliance with these rules.

Article 3.2. states that food business operators shall identify any step in their activities which is critical to ensure food safety and ensure that adequate safety procedures are identified, implemented, maintained and reviewed on the basis of the principles used to develop the system of HACCP (Hazard Analysis and Critical Control Point).

The risks which may originate from the manufacturing of jams, jellies and marmalades are very limited. Jams, jellies and marmalades are by nature, not susceptible to deterioration to an extent that would cause a public health issue.

In order to minimise the probability of hygienic risks to occur, **O.E.I.T.F.L** as the representative of the European jams, jellies and marmalades industry decided to develop a voluntary guide of good hygiene practice which meets the requirements of Directive 93/43/EEC of June 14th, 1993 taking into account the Revised Codex Alimentarius General Principles of Food Hygiene (CAC/RCP1-1969 Rev 3- 1997) as well as the Codex Guidelines For The Application of The HACCP System (annex to CAC/RCP 1-1969 Rev 3 – 1997)

This guide covers the jams, jellies and marmalades manufacturing process and analyses as an example, some relevant production operational steps with the HACCP approach in order to highlight potential hazards and to recommend preventive controls. The guide covers the relevant aspects from raw materials to finished products.

SECTION 1 : OBJECTIVES AND SCOPE

This document addresses to jams, jellies, marmalades and related products manufacturers who shall use it as a basis for their operations.

- 1.1.** This voluntary Code recommends appropriate general hygienic practices for use in the extraction, preparation, processing, manufacturing, packaging, storage, transportation and distribution of jams, jellies, marmalades and related products to ensure a safe, sound and wholesome product. The document incorporates the principles of HACCP (Hazard Analysis and Critical Control Points) system.
- 1.2.** It is further intended to assist manufacturers in maintaining appropriate hygienic standards in their production plants, taking into account their particular business environment. Therefore, some commonly used processes will be described as examples to be used by manufacturers for their specific processes.
- 1.3.** This guide is not intended to replace any legislative document on hygiene which may apply to the industry. The recommendations given in this guide are based on well-established principles in order to ensure the integrity of the products.

SECTION 2 : DEFINITIONS AND ABBREVIATIONS

For the purpose of this guide, the following expressions have the meaning stated.

Adequate :

sufficient to accomplish the intended purpose

Critical Control Point (CCP) :

a point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to an acceptable level.

Cleaning :

the removal of food residues and foreign matters including soils, dirt, grease or others.

Contamination :

occurrence in the beverages of microorganisms, or chemicals, or foreign bodies.

Corrective action :

the actions to be taken when the results of the monitoring of the CCP indicate a loss of control.

Critical limit :

a value which separates acceptability from unacceptability.

Disinfection :

the reduction by means of hygienically satisfactory chemical agents and/or physical methods, of the number of micro-organisms to an acceptable level.

Establishment plant :

any building or area in which jams, jellies and marmalades are manufactured under the control of the same management.

Fail-safe construction :

a construction that prevents contamination hazards following failure of auxiliary supplies.

Good manufacturing practices (GMP) :

the practices used by man to protect his food. The current basic thrust of the GMP's are directed toward food safety and quality assurance.

Hazard Analysis Critical Control Point (HACCP) :

a system which identifies specific hazard(s) and preventive measures for their control.

Hazard :

the potential to cause harm. Hazards can be biological, chemical or physical.

Jams, Jellies and Marmalades :

Jams, jellies and marmalades as defined in Council Directives 79/693 and 88/593

Lot :

a batch of sales unit of jams, jellies and marmalades produced, manufactured or packaged under

practically the same condition (Council Directive 89/396/EEC of 14 June 1989).

Monitor :

to conduct a planned sequence of observations or measurements to assess whether CCP is under control.

Pests :

any animal capable of directly or indirectly contaminating jams, jellies and marmalades, such as : insects, rodents, acarians, spiders, etc.

Potable water :

water that meets the requirements of Council Directive 80/778/EEC of 15 July 1980 and/or that meets the requirement of Council Directive 93/77/EEC of 21 September 1993, article 1, 5, b.

Process water :

water treated to meet the requirement of a process.

Primary packaging :

any container (glass, plastic, metal or carton, one-way or returnable and its closure system), to be filled with jams, jellies and marmalades properly labelled and intended for distribution.

Safe :

the status of a jams, jellies and marmalades which is not harmful to consumers.

Sanitary construction :

a construction designed and built to be easily cleanable.

Sanitation :

combined action of cleaning and disinfection.

Secondary packaging :

any materials such as labels, cartons, boxes, cases, crates or wrapping and covering material such as foil, film and cardboard.

Wholesome :

fit for human consumption as far as hygiene is concerned

SECTION 3 : PRIMARY PRODUCTION

Objectives :

Food sources should be managed in a way that ensures contaminants are not present in food and/or food ingredients to levels which would render end-products potentially harmful to human health or unsuitable for human consumption. Where necessary, this will include :

- ⇒ avoiding the use of areas where the environment poses a threat to food;
- ⇒ controlling contaminants, pests and diseases in such a way as not to pose a threat to food;
- ⇒ adopting practices and measures to ensure food is produced under appropriately hygienic conditions.

Rationale :

Ineffective control measures in primary production may adversely affect the safety of food, or its suitability for consumption, at later stages of the food chain.

3.1. ENVIRONMENTAL HYGIENE

Potential sources of contamination from the environment should be considered. In particular, primary food production should not be carried on in areas where the presence of potentially harmful substances would lead to an unacceptable level of such substances in food.

3.2. HYGIENIC PRODUCTION OF FOOD SOURCES

Producers should consider measures to :

- ⇒ Control contamination from water, feedstuffs, fertilizers, pesticides or any other agent used in primary production;
- ⇒ Control plant and animal health so that it does not pose a threat to human health through food consumption, or adversely affect the suitability of the product; and
- ⇒ Protect food sources from faecal and other contamination.

In particular, care should be taken to manage waste, and store harmful substances appropriately.

3.3. PROCESSING, HANDLING, STORAGE AND TRANSPORT

The potential effects of primary production activities on the safety and suitability of food should be considered at all times. In particular, this includes identifying any specific points in such activities where a high risk of contamination may exist and taking specific measures to reduce that risk.

Food or food ingredients should be :

- ⇒ Sorted to segregate those obviously unfit for human consumption, which should be hygienically disposed of; and
- ⇒ Protected from contamination by pests, or by chemical, physical or microbiological contaminants or other objectionable substances during processing, handling, storage and transport.

Care should be taken to prevent, so far as reasonably practicable, deterioration and spoilage through appropriate measures which may include controlling temperature, humidity, and/or by other micro-environmental controls.

3.4. CLEANING, MAINTENANCE AND PERSONAL HYGIENE

Appropriate facilities and procedures should be in place to ensure that :

- ⇒ Any necessary cleaning and maintenance is carried out effectively; and
- ⇒ An appropriate degree of personal hygiene is maintained.

SECTION 4 : DESIGN OF ESTABLISHMENT

Objectives :

The nature of the operations in jams, jellies and marmalades plants requires that :

- ⇒ design and layout permit adequate maintenance, cleaning and/or disinfection;
- ⇒ equipment materials in contact with fruits and ingredients, are of good quality and easy to sanitise;
- ⇒ temperature, humidity and environment can be controlled in jams, jellies and marmalades processing areas where necessary; and
- ⇒ protection against pest access is effective.

Rationale :

Attention to good hygienic design and construction, appropriate siting, and the provision of adequate facilities, is necessary to enable the production process to be effectively controlled.

4.1. ESTABLISHMENT

4.1.1. General requirements

- ⇒ Buildings and facilities should be maintained in good repair.
- ⇒ They should :
 - permit easy and adequate cleaning and facilitate proper supervision of hygiene;
 - ensure a rational production flow in order to avoid cross contamination;
 - provide appropriate temperature conditions for the raw materials, the process and the products.
- ⇒ Adequate working space should be provided to allow satisfactory cleaning operations.

4.1.2. Perimeter

It is recommended to have good housekeeping practices for the grounds. It is also advisable to have paved road systems and parking areas which are properly drained.

4.1.3. Maintenance

- ⇒ Any external opening such as doors, windows, ventilation systems and drain outlets should be maintained to prevent pest access.
- ⇒ The inside of the buildings should be maintained in high standard of repair and decoration.

4.2. PRODUCTION AREAS

4.2.1. General requirements

⇒ Design and layout of raw materials, semi-finished products and finished products rooms and filling halls should :

- permit efficient cleaning and/or disinfection;
- protect the product against the ingress of any foreign material;
- minimize condensation and mold growth on surfaces;
- avoid cross contamination between and during operations;
- have suitable environmental conditions for the hygienic processing;
- provide washbasins;
- have effective ventilation systems;
- have adequate lighting; and,
- have adequate drainage systems.

⇒ Fruit processing, blending, preparation, filling, packaging and water treatment should be performed in separate systems providing that these systems should prevent cross contamination.

4.2.2. Specific requirements

4.2.2.1. Wall and floor surfaces in blending, preparation and filling areas

- ⇒ The surfaces of walls, partitions and floors should be made of impervious, non absorbent and easily washable materials. The materials should be chemical resistant and should comply with food regulations.
- ⇒ Floors should have a non-slip finish and be sloped to drain effectively. Drains should have an adequate capacity and be provided with covers, sediment traps and water locks. Floors should withstand heavy loads, where necessary.

4.2.2.2. Ceilings and lighting

- ⇒ Adequate lighting should be provided to monitor plant cleanliness.
- ⇒ Ceilings and overheads fixtures should be of impervious nature in order to prevent the accumulation of dirt.
- ⇒ Light fixtures should be covered.

4.2.2.3. Windows and skylights

Windows and sills should provide not contaminating income and should be impervious and easily cleanable.

4.2.2.4. Doors

Doors should be impervious and easily cleanable and should provide non contaminating income.

4.2.2.5. Auxiliary structures

Other constructions such as stairs, steps, platforms, etc. should be of sanitary construction.

4.3. EQUIPMENT

4.3.1. General requirements

- ⇒ All parts of equipment coming into contact with fruit and jams, jellies and marmalades must be of sanitary construction and must be maintained in good order and repair as to minimize any risk of contamination.
- ⇒ Equipment should be installed in such a manner as to allow adequate cleaning of the surrounding area.
- ⇒ It is recommended that all production equipments, tanks and pipeworks are made of high-grade stainless steel. Suitable alternatives to stainless steel are available and should be of good quality.
- ⇒ Fixtures, piping and ducts should be kept to a minimum over tanks and other processing equipments.
- ⇒ Tanks should be suitably covered.
- ⇒ Wood should be discouraged where possible.

4.3.2. Temperature control systems and monitoring equipment

Pasteurizers should be designed to achieve the required temperatures as rapidly as necessary. Temperatures must be controlled and monitored.

4.3.3. Containers for waste

- ⇒ Containers for waste should be clearly identified, be of impervious material, leakproof and sited in a dedicated area.
- ⇒ There should be dedicated bins to collect waste (labels, broken glass bottles, etc.) in production areas. These bins should be emptied and cleaned on a daily basis.

4.4. FACILITIES

4.4.1. Fluids supplies

4.4.1.1. Potable water

There must be an adequate supply of potable water.

4.4.1.2. Process water

It must be avoided that process water gets in contact with the final product. Process water should have a separate system and water lines should be readily identifiable by colour. There should be no possibility of process water entering the potable water network.

4.4.1.3. Steam

- ⇒ Steam used in direct contact with product or product contact surfaces must not contain any substances which may constitute a threat to the safety of the food.
- ⇒ Steam used directly as a sanitising agent must be generated from water of appropriate quality.

4.4.2. Drainage

- ⇒ Jams, jellies and marmalades plants should have an effective drainage system.
- ⇒ All effluent lines, including sewer systems, must be large enough to carry peak loads.
- ⇒ They must be designed and constructed so that there is no risk of contamination.

4.4.3. Cleaning and disinfection

- ⇒ Facilities for cleaning and disinfection of equipments, utensils and work tools must be provided.
- ⇒ Such facilities should be of sanitary construction and be fitted with an adequate supply of hot and/or cold water.

4.4.4. Personnel hygiene and toilets

Hand washing facilities, toilets and changing facilities must be available for the employees and should be separated from the production areas.

4.4.4.1. Hand washing

Facilities for hand washing and hygienic drying must be available wherever the

process demands. They should be provided with cold and/or hot water.

4.4.4.2. Toilets

- ⇒ Toilets must be provided in production plants. Toilets must not open directly into production areas and be well lighted and ventilated.
- ⇒ Hand washing and adequate clean drying facilities must be adjacent to toilets.
- ⇒ Signs should be posted directing personnel to wash their hands after using toilets.

4.4.4.3. Refectory

A separate room should be provided for breaks and to have meals, snacks and other refreshments.

4.4.5. Ventilation

- ⇒ Adequate means of natural or mechanical ventilation should be provided in all production areas in order to :
 - prevent excessive build up of heat, relative humidity, odors and dust; and,
 - minimize the risk of contamination of products and ingredients.
- ⇒ Mechanical ventilation systems including filters should be designed and constructed so that they can be easily cleaned.

4.4.6. Storage areas

- ⇒ Production sites should have appropriate storage areas for products, ingredients, packaging materials, cleaning materials, auxiliary substances, waste, etc.
- ⇒ Storage areas for raw materials and finished products must be designed to :
 - meet the requirements for the stored products;
 - permit adequate cleaning;
 - avoid pest access and harbourage; and,
 - protect food from environmental influences.
- ⇒ Special storage areas are required for cleaning materials and for other chemicals used within the plant. Containers previously used for these auxiliary products may not be subsequently used for another purpose. These areas must be locked.

4.4.7. Thermic engines

Thermic engines, such as fork trucks, should be discouraged from the processing areas.

SECTION 5 : CONTROL OF OPERATION

Objective :

To produce jams, jellies and marmalades with a high standard of safety by applying an effective control program.

Rationale :

To minimize the risk of contamination of the products at all stages of the operations.

5.1. CONTROL OF POTENTIAL PRODUCT CONTAMINATION

5.1.1. General methodology

⇒ Jams, jellies and marmalades processors and manufacturers shall :

- define target customers essential product characteristics such as formulation, process conditions, packaging, shelflife and storage conditions;
- identify any step in their operations which is critical to the safety of the fruit jams, jellies and marmalades;
- implement effective control procedures at those steps;
- monitor control procedures to ensure their continuing effectiveness; and
- review control procedures periodically, and whenever the operation changes.

⇒ These concepts shall be applied through the whole manufacturing process.

⇒ A model of such a system is described in Codex document WHO/FNU/FOS93.3 entitled "Codex guidelines for the application of the hazard analysis critical control point (HACCP) system".

5.1.2. Application to jams, jellies and marmalades manufacturing

Using the logic sequence of diagram 1 of the Codex document, a typical layout is presented in annex 1. It is essential to realise that the principles of the HACCP system have to be applied to each factory for its particular products.

Critical limits and monitoring will be specific to each factory/product.

5.2. MAIN CATEGORIES OF CONTAMINATION

5.2.1. Microbiological contamination

5.2.1.1. Sources

- ⇒ Raw materials;
- ⇒ Insufficient processing; and
- ⇒ Unsanitary conditions of process equipment.

5.2.1.2. Preventive actions

- ⇒ Assurance of raw materials, ingredients and primary packaging
 - Only raw materials, including both ingredients and primary packaging, complying with legal requirements and producer specifications should be accepted.
 - All raw materials should be inspected at receipt and clearly labelled. Laboratory tests should be made where necessary and certificates of analysis should be supplied, when possible, by the manufacturer at each delivery.
 - Raw materials stored on the premises of the production plant be maintained under conditions that will protect their integrity. Storage premises shall be separated into allocated areas for each category of packaging materials : labels, closures, bottles, cans, etc. As packaging material can generate a lot of dust, care must be taken to avoid the contamination of containers.
 - Sensitive ingredients such as sugars, pectins and juices require controlled storage conditions.
- ⇒ Temperature control
 - Systems should be in place to ensure that temperature is controlled effectively where it is critical to the safety of the product.
 - Inadequate temperature control is one of the most common causes of product spoilage. Such controls include time and temperature for pasteurizing operations, washing containers and cleaning-in-place operations, if necessary
 - Temperature recording devices should be checked at regular interval and tested for accuracy by internal or external audits.
- ⇒ Cross-contamination
 - Microorganisms can be transferred to the product by direct or indirect contacts throughout raw materials, equipment, environment or personnel.
 - Surfaces, utensils and equipments should be thoroughly cleaned and disinfected prior to and after being used for jams, jellies and marmalades production.
 - Separate filling areas and preparation rooms for processing activities should be available.

- Access to preparation and filling areas need to be restricted or controlled. Personnel must wear appropriate protective clothing.

5.2.2. Chemical contamination

5.2.2.1. Sources

- ⇒ Cleaning and disinfection agents;
- ⇒ Raw materials;
- ⇒ Ingredients/Additives/Processing Aids.

5.2.2.2. Preventive actions

- ⇒ Adequate control procedures
- ⇒ Sanitation processes must guarantee the complete draining and rinsing of the equipment. Checks must be performed after each sanitising operation.
- ⇒ Only raw materials, including both ingredients and primary packaging, complying with legal requirements and producer specifications should be accepted.

5.2.3. Physical contamination (foreign bodies)

5.2.3.1. Sources

- ⇒ Raw materials;
- ⇒ Parts of equipment and installation;
- ⇒ Workforce;
- ⇒ Pests;
- ⇒ Ingredients/Additives/Processing Aids.

5.2.3.2. Preventive actions

- ⇒ Only raw materials, including both ingredients and primary packaging, complying with legal requirements and producer specifications should be accepted.
- ⇒ Systems shall be in place to reduce the risk of jams, jellies and marmalades, ingredients and primary packages being contaminated by foreign bodies such as glass, metal shards from machinery, dust, etc.

- ⇒ In preparation and filling areas, suitable detection systems or filters should be used. The efficiency of these devices shall be regularly controlled.

These concepts shall be applied through the whole manufacturing process.

5.3. MANAGEMENT AND SUPERVISION

Management should be knowledgeable of food hygiene principles and practices in order to evaluate risks and to ensure effective monitoring and supervision.

5.4. DOCUMENTATION AND RECORDS

For each lot, production and quality records for processing, blending, preparation, filling, packaging and distribution must be kept at least for the duration of the product's shelf life.

5.5. COMPLAINT AND RECALL PROCEDURES

- ⇒ An effective procedure should be in place to handle complaints by consumers and authorities.
- ⇒ An effective recall procedure should be in place.

SECTION 6 : HOUSEKEEPING

Objectives :

To establish effective systems to ensure :

- ⇒ tidiness of production and storage areas;
- ⇒ adequate maintenance and sanitation of production equipment and
- ⇒ effective pest control.

Rationale :

To create a tidy and clean environment which ensures the production of safe and sound jams, jellies and marmalades

6.1. GENERAL HOUSEKEEPING

- ⇒ Buildings and processing equipments should be appropriately maintained.
- ⇒ All utensils, tools, change parts, packaging materials, auxiliary products, etc. which are not needed for production should be properly stored.
- ⇒ Water hoses should be kept on reels when not in use.
- ⇒ Industrial sanitation chemicals should be handled and used carefully and in accordance with manufacturers' instructions to avoid the risk of contaminating jams, jellies and marmalades and ingredients.

6.2. SANITATION PROGRAMS AND METHODS

Sanitation can be done by separate or combined use of physical and chemical methods. For each part of the production area and processing equipment, written effective sanitation programs shall be in place and known by the operators. They should specify :

- ⇒ The area in which the program is to be applied;
- ⇒ The equipment and/or utensil;

- ⇒ The method; and,
- ⇒ The person responsible.

The method shall specify :

- ⇒ The agents to be used;
- ⇒ The frequencies, durations and concentrations;
- ⇒ The documentation; and,
- ⇒ The verification.

6.3. RECORDING OF SANITATION

- ⇒ Cleaning and sanitation programs should ensure that all parts of the production equipment are clean and should be effectively monitored.
- ⇒ Written sanitation programs shall specify :
 - when and how, areas, items of equipment and utensils to be sanitised;
 - responsibility for each task; and,
 - monitoring and recording of sanitation conditions and results.

6.4. PEST CONTROL SYSTEMS

Production plants should be regularly examined for the evidence of pest infestation by means of an effective pest control program.

6.5. MONITORING EFFECTIVENESS OF HOUSEKEEPING

Maintenance, cleaning and sanitation systems should be monitored for effectiveness and regularly reviewed and adapted to reflect changed circumstances.

SECTION 7 : PERSONAL HYGIENE

Objectives :

To ensure that production personnel :

- ⇒ maintains a high standard of personal cleanliness and appearance;
- ⇒ operates according to hygienic manufacturing principles.

Rationale :

To ensure operators awareness and application of hygienic manufacturing principles.

7.1. HEALTH

Personnel who have an infectious or contagious disease, or any illness or injury liable to contaminate the product, must not be assigned to the preparation or processing of the product.

7.2. PERSONAL CLEANLINESS

- ⇒ All operators should maintain a high degree of personal cleanliness and wear clean protective clothing and head covering, where necessary.
- ⇒ All operators must wash their hands before starting work and immediately after using the toilets.

7.3. HYGIENIC MANUFACTURING PRINCIPLES

- ⇒ Smoking, eating and drinking in the production areas is prohibited.
- ⇒ Jewellery should not be worn in processing areas.
- ⇒ Containers shall not be used for any other purpose than their intended use.

7.4. VISITORS

Any visitor or contractor to the plant should be advised of hygiene requirements and their need to comply with them.

7.5. SUPERVISION

Plant management shall be responsible for ensuring that the hygienic manufacturing principles are applied.

SECTION 8 : DISTRIBUTION

Objectives :

Measures should be taken to protect packaged jams, jellies and marmalades from damages in order to assure that a sound product is offered to the consumer.

Rationale :

To ensure that consumers receive a sound product.

Raw materials and packaged products should be transported in suitable, clean and covered trucks.

SECTION 9 : TRAINING

Objectives :

Production plant operators must be appropriately trained and supervised, to a sufficient level.

Rationale :

To ensure operators the knowledge of hygienic manufacturing practice.

9.1. AWARENESS AND RESPONSIBILITIES

- ⇒ Managers and supervisors of jams, jellies and marmalades plants should have sufficient knowledge of food hygiene principles and practices to be able to judge potential risks and take the necessary action to remedy weaknesses.
- ⇒ All personnel should be aware of their role in protecting products and raw materials from contamination or deterioration. Operators should have the necessary knowledge to enable them to handle products and raw materials hygienically. Those who handle chemicals should be instructed in safe handling techniques.

9.2. TRAINING PROGRAMS

Training programs adapted to products, processors and packages should be developed and regularly applied and updated.

9.3. INSTRUCTION AND SUPERVISION

Periodic assessments of training should be made, as well as routine supervision to check and to ensure that procedures are being carried out effectively.

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